

Modiolus demissus: A New Host for the Oyster Crab

Pinnotheres ostreum in Virginia¹

BY

PAUL A. SANDIFER²

AND

WILLARD A. VAN ENGEL

Virginia Institute of Marine Science, Gloucester Point, Virginia 23062

Pinnotheres ostreum SAY, 1817, COMMONLY PARASITIC in the oyster *Crassostrea virginica* (GMELIN, 1791), also may infest the jingle shell *Anomia simplex* ORBIGNY, 1845, and the edible mussel *Mytilus edulis* LINNAEUS, 1758 (McDERMOTT, 1961, 1962). A fourth host, the ribbed mussel *Modiolus demissus* (DILLWYN, 1817) should now be added to the list of bivalves parasitized by this crab.

Mussels were collected from intertidal mussel beds at Sandy Point in the lower York River, Virginia (37°16'N, 76°33'W), from November, 1968, through June, 1969. Of 747 *Modiolus demissus* collected, 136 (18.2%) contained *Pinnotheres ostreum*. All of the crabs were small (0.71 to 3.15 mm carapace width) pre-hard and hard-stage (Stage I) crabs. No developmental stages later than the hard stage were seen. Gill erosions similar to those caused by young *P. ostreum* in *Crassostrea virginica* (CHRISTENSEN & McDERMOTT, 1958) were often associated with the presence of the crabs in *M. demissus*.

Crabs were found in the mussels during all months except January, when no samples were taken. The majority of the crabs apparently overwintered in the pre-hard stages and reached the hard stage in May. Following the molt to the hard stage, the crabs apparently left the mussels in June. McDERMOTT (1961, 1962) reported a similar emigration of *Pinnotheres ostreum* from *Mytilus edulis* at the hard stage. He (personal communication) has also found pre-hard and hard-stage, but never mature, female *P. ostreum* in *Modiolus demissus* in Delaware Bay.

The phenomenon of invasion of a "primary" host fol-

lowed by movement from that host, presumably in search of some "secondary" host, is not unique to *Pinnotheres ostreum* among the Pinnotheridae. Similar behavior has been described for the European mussel crab *P. pisum* (PENNANT, 1777) (CHRISTENSEN, 1958) and the west coast mussel crab *Fabia subquadrata* DANA, 1851 (PEARCE, 1966). In all three species the apparent emigration occurs at the hard stage, which is morphologically adapted for a free-living existence and for invasion of a second host. The reasons for these emigrations, however, are obscure. CHRISTENSEN's (1958) observations suggest that in the area in which he worked *P. pisum* is selectively attracted to *Spisula solida* (LINNAEUS, 1758) at the invasive stage and to *Modiolus modiolus* (LINNAEUS, 1758) at the hard stage. This does not seem to be the case with *P. ostreum* and *F. subquadrata*, both of which commonly occur in their secondary, as well as their primary, hosts at the invasive stage. PEARCE (1966) did not believe that the primary hosts of *F. subquadrata* were large enough to accommodate the adult female crabs. Primary host size, however, cannot explain the failure of *P. ostreum* to reach maturity in *Mytilus edulis* and *Modiolus demissus*. *Pinnotheres ostreum* reaches maturity in *Anomia simplex* (McDERMOTT, 1961, 1962) which has a smaller mantle cavity than do the mussels; *Mytilus edulis* commonly contains adults of *P. pisum* (comparable in size to *P. ostreum*) in European waters; and *Modiolus modiolus* (comparable in size to *Modiolus demissus*) accommodates adults of the large pinnotherid, *F. subquadrata*. Other facets of host biology, such as differences in pumping rates and mucus secretions, as well as requirements and tolerances of the crabs, must be considered in any attempt to ascertain the reasons for these emigrations.

¹ Contribution No. 347 from Virginia Institute of Marine Science, Gloucester Point, Virginia 23062

² Recipient of an NDEA Title IV Graduate Fellowship during the study.

LITERATURE CITED

- CHRISTENSEN, AAGE MOLLER
1958. On the life history and biology of *Pinnotheres pisum*.
XV Intern. Congr. Zool., sect. III, paper 15: 1 - 3
- CHRISTENSEN, AAGE MOLLER & JOHN J. McDERMOTT
1958. Life-history and biology of the oyster crab, *Pinnotheres
ostreum* SAY. Biol. Bull. 114 (2): 146 - 179
(April 1958)
- McDERMOTT, JOHN JOSEPH
1961. The incidence and host-parasite relations of pinnotherid
crabs in bivalve molluscs of New Jersey. Ecol. Soc. Amer.,
Bull. 42 (3): 82 (September 1961)
1962. The incidence and host-parasite relations of pinnotherid
crabs (Decapoda, Pinnotheridae). Proc. first Natl. Coastal
Shallow Water Res. Conf. October, 1961: 162 - 164
(February 1962)
- PEARCE, JACK B.
1966. The biology of the mussel crab, *Fabia subquadrata*,
from the waters of the San Juan Archipelago, Washington.
Pacific Sci. 20 (1): 3 - 35 (January 1966)

